

CLAIM AMENDMENTS

Please amend claims 8, 9, 10 and 12, without prejudice, and add new claims 13 –28, as indicated in the following listing of all the claims remaining in the present application after this Preliminary Amendment.

1. (original) A method of operating a flash memory cell array that is organized into sub-arrays with the sub-arrays including blocks of a minimum number of memory cells that are erasable together and the blocks storing a number of units of data, comprising:

identifying when a scrub trigger event has occurred for data stored in at least one of the units of data in a first one of the blocks,

reading the identified at least one unit of data from the first block,

correcting any errors in the data read from the first block to provide corrected first block data,

writing the corrected first block data as at least one unit of data to a second one of the blocks, and

thereafter copying uncorrected data units of the first block into the second block, thereby to consolidate in the second block corrected and uncorrected units of data originally of the first block.

2. (original) The method of claim 1, additionally comprising, prior to writing the corrected first block data into the second block, of temporarily storing the corrected first block data in a third block.

3. (original) The method of claim 2, additionally comprising:

identifying when a disturbing event has occurred for at least one of the units of data stored in a fourth one of the blocks,

reading the identified at least one unit of data from the fourth block,

correcting any errors in the data read from the fourth block to provide corrected fourth block data,

temporarily storing the corrected fourth block data in the third block, and

thereafter writing the corrected fourth block data as at least one unit of data to a fifth one of the block,

thereafter copying uncorrected data units of the fourth block into the fifth block, thereby to consolidate in the fifth block corrected and uncorrected units of data originally of the fourth block .

4. (original) The method of claim 1, wherein the scrub trigger event includes an event disturbing said at least one of the data units stored in the first block.

5. (original) The method of claim 1, additionally comprising pausing the operation after reading the data but before correcting any errors thereof, until other higher priority operations are performed.

6. (original) The method of claim 1, additionally comprising pausing the operation after correcting any errors thereof but before writing the corrected data, until other higher priority operations are performed.

7. (original) A method of operating a flash memory cell array, comprising:  
identifying when a scrub trigger event has occurred for data stored in at least one location of the array,

reading the data stored in said at least one location in the array,  
temporarily storing information about said at least one location and the data read therefrom,

while this information remains stored, programming or reading other data to or from at least locations within the array other than said at least one location,

thereafter determining whether there are any errors in the read data read from said at least one location in the array,

utilizing the stored information, correcting any errors in the data read from said at least one location in the array, and  
writing the corrected data into the array.

8. (currently amended) The method of claim 7, wherein the scrub trigger event includes an event disturbing ~~said at least one of the data units stored in said at least one location in the array the first block.~~

9. (currently amended) A method of operating a flash memory cell array, comprising:

identifying when a scrub trigger event has occurred for data stored in at least one location of the array,

reading the data stored in said at least one location in the array,

thereafter determining whether there are any errors in the read data read from said at least one location in the array,

correcting any errors in the data read from said at least one location in the array,

temporarily storing the corrected data,

while the corrected data remain stored, programming or reading other data to or from at least locations within the array other than said at least one location, and thereafter writing the corrected data into the array.

10. (currently amended) The method of claim 9, wherein the scrub trigger event includes an event disturbing ~~the data stored in said at least one location in the array of the data units stored in the first block.~~

11. (original) A method of operating an erasable and re-programmable non-volatile memory system having an array of memory cells organized into blocks of a minimum number of memory cells that are erasable together that include a plurality of pages individually storing one or more units of data, comprising:

in response to the occurrence of at least one of a plurality of predefined events, identifying at least one page of at least one block to be scrubbed,

reading data stored in said at least one page with a first set of read conditions,

determining whether there are any errors in the read data, and, if so, whether the errors can be corrected,

in response to determining that the errors in the read data cannot be corrected, re-reading the data stored in said at least one page with a second set of read conditions,

determining whether there are any errors in the re-read data, and, if so, whether the errors can be corrected,

in response to other memory activity being scheduled, deferring further action with respect to the read or re-read data,

after the other memory activity is completed and in response to determining that the errors in either of the read or re-read data can be corrected, correcting such errors to provide corrected data, and

writing the corrected data into at least a second page of a second block different from said one block.

12. (currently amended) The method of claim 11, additionally comprising copying unchanged data from pages within said at least one block ~~other than said one block~~ into the second block.

13. (new) A method of operating groups of re-programmable non-volatile memory cells that store data as levels of charge therein, wherein individual ones of the groups store a plurality of units of data, and further wherein:

in response to the occurrence of at least one predefined condition, data are read from at least one unit of a first group of memory cells,

it is then determined whether there are any errors in the read data,

in response to at least errors being determined to exist in the read data, an effort is made to recover the data erroneously read from said at least one unit of the first group,

if recovered, the recovered data are written into at least one unit of a second group of memory cells different from the first group of memory cells, and

data read without errors from other units of the first group of memory cells are copied into units of the second group of memory cells other than its said at least one unit, thereby to consolidate in the second block data read without errors and recovered data originally of the first block.

14. (new) The method of claim 13, further wherein, before the recovered data are written into said at least one unit of the second group, the recovered data are written into a third group different from the first and second groups along with data recovered from at least one group other than the first, second or third groups, and thereafter the recovered data are copied from the third group into the second group and data read without errors from other units of the first group are copied from the first to the second group.

15. (new) The method of claim 13, wherein the effort to recover the erroneously read data includes use of an error correction code read along with the data.

16. (new) The method of claim 15, wherein the effort to recover the erroneously read data includes, if the use of the error correction code is not successful, re-reading the data under different conditions than the data are initially read.

17. (new) The method of claim 13, wherein said at least one predefined condition includes any one or more of programming, reading or erasing memory cells having at least one conductor in common with at least some of the memory cells of said at least one unit of the first group of memory cells.

18. (new) The method of claim 13, wherein said at least one predefined condition includes receiving a command from a host to which the groups of memory cells are operably connected.

19. (new) The method of claim 13, wherein said at least one predefined condition includes storage of current data in said at least one unit of a first group of memory cells for fewer than a predefined number of memory operations.

20. (new) The method of claim 13, wherein said at least one predefined condition includes identification of said at least one unit of the first group of memory cells by a deterministic or random sequence.

21. (new) The method of claim 13, further wherein the memory cells in individual ones of the groups are simultaneously erased.

22. (new) The method of claim 13, further wherein the memory cells receiving individual ones of the units of data are simultaneously programmed.

23. (new) A method of operating groups of re-programmable non-volatile memory cells that store data as levels of charge therein, wherein individual ones of the groups store a plurality of units of data, and further wherein:

data are read from at least a first group of memory cells,

it is then determined whether there are any errors in the data read from at least one unit of the first group of memory cells,

in response to at least errors being determined to exist in the read data, an effort is made to recover the data erroneously read from said at least one unit of the first group,

if recovered, the recovered data are written into at least one unit of a second group of memory cells different from the first group of memory cells, and

data read without errors from other units of the first group of memory cells are copied into units of the second group of memory cells other than its said at least one unit, thereby to consolidate in the second block data read without errors and recovered data originally of the first block.

24. (new) The method of claim 23, further whercin, before the recovered data are written into said at least one unit of the second group, the recovered data are written into a third group different from the first and second groups along with data recovered from at least one group other than the first, second or third groups, and thereafter the recovered data are copied from the third group into the second group and data read without errors from other units of the first group are copied from the first to the second group.

25. (new) The method of claim 23, wherein the effort to recover the erroneously read data includes use of an error correction code read along with the data.

26. (new) The method of claim 25, wherein the effort to recover the erroneously read data includes, if the use of the error correction code is not successful, re-reading the data under different conditions than the data are initially read.

27. (new) The method of claim 23, further wherein the memory cells in individual ones of the groups are simultaneously erased.

28. (new) The method of claim 23, further wherein the memory cells receiving individual ones of the units of data are simultaneously programmed.